# The Automobile Speaks

## It tells you what it is, what it requires and it asks to be treated fairly.

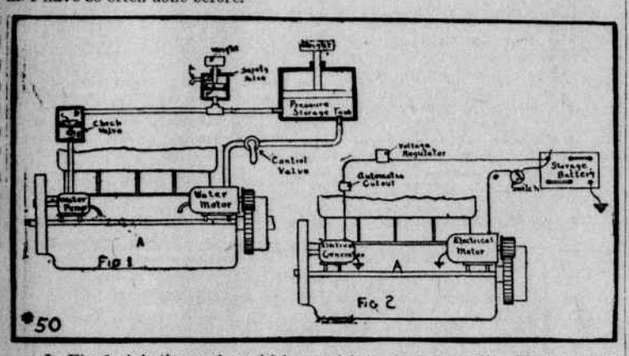
By Frederick C. Guerrlich.



### NUMBER 50.—THE STARTING AND LIGHTING SYSTEM.

Before going into the study of the starting and lighting system, I want to call attention to the fact that a "self-starter" is nothing more that a device for cranking the engine. As the self-starter is only a device for cranking the engine, the engine must be prepared for starting, the ignition switch must be thrown on, the spark retarded, carburetor primed, just as it would be were the cranking done by hand. Some people have an idea that by self-starter is meant that the engine will start of its own accord. This is not so.

In explaining the various units necessary in an electrical starting system, I am going to compare the flow of the electrical current to the flow of water, as I have so often done before.




*50

In Fig. 1, A is the engine which we wish to start or crank. If we were to fasten a gear to the flywheel, and then had another gear or pinion engaged with this gear, and then made the pinion revolve, the flywheel would be made to revolve and so the engine would be cranked.

Let us assume that the pinion is driven by a water-motor, as shown. Now, for this water-motor to operate, water under pressure must be sent to it. Well, from where shall we get this water? Let us furnish a pressure-storage tank, such as shown, for this purpose, and let us have a weight resting on top of the water in the tank so as to give the required pressure to drive the water-motor.

As we want the cranking motor to work only when we want to start the engine, some device which can control must be placed between the motor and the tank, whereby the water can be allowed to flow to the motor, or stopped from flowing to it, at will. A valve would be such a device.

Refer now to Fig. 2. Here we have an electrical motor geared to the flywheel of the engine, and we have a storage battery which will send a current of electricity under pressure to the motor, and we have a switch to control the flow of this electricity. For the pressure-storage tank, we have substituted the storage battery; for the control valve, the switch, and for the water motor, the electrical motor.

Coming back to Fig. 1, as the cranking-motor is used, the water is drawn out of the tank and it would soon be empty unless other water is sent or pumped to it. How then shall we take care of this problem? Why, simply by connecting a pump to the tank and driving the pump by means of the engine.

As the water tank becomes empty, so will the storage battery, but by connecting an electrical generator to the storage battery and driving this generator from the engine the storage battery can be kept charged.

Refer again to Fig. 1. Obviously the water will flow from the pump to the tank only when the pressure of the pump is greater than the pressure in the tank; not only that but the water will flow back from the tank to the pump under these conditions, and so the tank would become empty. Thus a device, such as the check valve shown, must be placed between the pump and tank, which will let the water flow from the pump to the tank, but will stop it from flowing from the tank to the pump.

In the same way some device must be placed between the storage battery and generator which will prevent the current from flowing from the storage battery to the generator when the pressure or voltage of the generator is less than the pressure (or voltage) of the battery. For this purpose what is known as an **automatic cutout** is furnished.

On most cars the voltage of the generator will be greater than the battery voltage only when the engine is running at a speed which would drive the car at a speed of fifteen miles per hour or more. For this reason the cutout must disconnect the battery and generator when the engine is idle or running below the above speed.

The automatic cutout takes care of the problem of the generator's voltage (pressure) being too low, but at high speeds the voltage may be high; thus here is another problem.

Again referring to Fig. 1. Suppose that the pressure-storage tank were full and suppose the pump were to create a pressure high enough to burst the tank. Our system would then be ruined, and so some device which will prevent the pressure getting above a certain point must be placed in the system. In the drawing I have shown this as a safety valve. Here, when the pressure in the system gets too great, the Valve F will raise against the weight and the water can then escape through the pipe L, and so no harm will be done.

We likewise have the problem of harm being done by the generator having too high a voltage (as you now know, voltage means electrical pressure) and so some device must be placed in the system to act as a sort of safety valve and prevent the battery being ruined, as it will be when the voltage of the generator is too high. This device is known as a voltage regulator.

The units in the lighting portion of the starting and lighting system are comparatively simple and they will be taken up later.

One other important device which the system must have is a system by which the driving pinion can be brought into mesh with the gear of the flywheel and, when the engine starts, disconnects therefrom. As this is sometimes the cause of trouble it will be taken up separately.

Let us tabulate the units of the system and give a definition for them.

First—The starting motor, the purpose of which is to crank the engine.

Second—The storage battery, for furnishing current to the motor.

Third—The starting switch, by which the flow of the current to the motor is controlled.

Fourth—The generator, which manufactures electricity and sends it to the battery, so as to keep the battery charged.

Fifth—The automatic cutout, which disconnects the battery and generator when the engine is idle or running slowly and so prevents the battery from being discharged through the generator.

Sixth—The voltage regulator, which prevents the voltage from becoming so high as to damage the battery.

We will take up these units, one by one, in our next lesson.

## BROADWAY ASSOCIATION TO HAVE BIG DINNER

Automobile men who contend that the motor car, with its allied interests, is the biggest thing along the "Great White Way" are going to try to prove their contention at the annual dinner of the Broadway Association, scheduled for April 19 at the Hotel Astor. The men whose business predominates in the neighborhood of the Circle are reserving so many tables for the Broadway Association's tenth annual celebration party that a whole section of the grand ballroom of the hotel may have to be reserved for them.

The president of the Broadway Association is Horace DeLisser, chairman of the board of the Ajax Rubber Company. Among the other prominent automobile men on the committee which is in charge of arrangements for the dinner are Sidney B. Bowman of the Kissel Car, Frank G. Carrie, Marmon; Lee J. Eastman, Packard; Glenn A. Tisdale, Franklin, and Inglis M. Uppercue, Cadillac.

### Pressure Tank Trouble.

When the supply tank of a motor car using exhaust gas pressure feed to the carburetor is refilled with gasoline most drivers use the hand pump provided to obtain enough pressure in the tank to get the motor started. Generally there is enough gasoline in the carburetor to permit of some minutes' operation by which the pressure in the tank will be raised sufficiently by the exhaust so that resort to the hand pump is needless. On some cars the hand pump is so rarely used that the washers in it dry up and the device is rendered useless. In such cases the desired results may be obtained by temporarily plugging the outlet of the exhaust pipe and then cranking the motor. This will create excessive pressure in the exhaust pipe, which will be conducted through the regular pressure piping to the fuel supply tank. Thus a few turns of the crank will be as effective as the pump would be if it were working.

### Scraping Pedal.

Many drivers of motor cars have been annoyed by a scraping sound when the brake pedal is depressed and frequently no reason can be discovered for this condition. As a matter of fact, it usually is caused by the pedal touching the flywheel or the sheet metal covering touching the flywheel. The remedy consists in either filing a little off the pedal or in making the throw shorter.